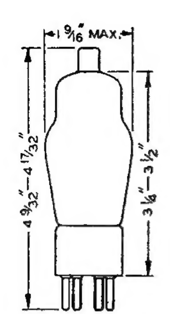
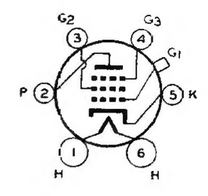


RCA-89



TRIPLE-GRID POWER AMPLIFIER

The 89 is a triple-grid power-amplifier tube of the heater-cathode type recommended for use in receivers with 6.3-volt heater supply. The triple-grid construction of this tube, with external connections for each grid, makes possible its application as (1) a Class A Power-Amplifier Triode, (2) a Class A Power-Output Pentode, and (3) a Class B Power-Output Triode.

CHARACTERISTICS

Heater Voltage (A. C. or D. C.)	6.3	Volts
Heater Current	0.4	Ampere
Bulb		ST-12
Cap		Small Metal
Base		Small 6-Pin

Class A_1 Power Amplifier—Triode Connection

(Grids No. 2 and No. 3 tied to plate)

Plate Voltage	160	180	250 *max.*	Volts
Grid Voltage (Grid No. 1)	−20	−22.5	−31	Volts
Plate Current	17	20	32	Milliamperes
Amplification Factor	4.7	4.7	4.7	
Plate Resistance	3300	3000	2600	Ohms
Transconductance	1425	1550	1800	Micromhos
Load Resistance*	7000	6500	5500	Ohms
Self-Bias Resistor	1180	1125	970	Ohms
Undistorted Power Output	0.3	0.4	0.9	Watt

* Optimum for maximum undistorted power output. Approximately twice the value or any given set of conditions is recommended for load of this tube when used as driver for Class B stage.

Class A_1 Power Amplifier—Pentode Connection

(Grid No. 3 tied to cathode)

Plate Voltage	100	135	180	250 *max.*	Volts
Screen Voltage (Grid No. 2)	100	135	180	250 *max.*	Volts
Grid Voltage (Grid No. 1)	−10	−13.5	−18	−25	Volts
Plate Current	9.5	14	20	32	Milliamperes
Screen Current	1.6	2.2	3.0	5.5	Milliamperes
Amplification Factor	125	125	125	125	
Plate Resistance	104000	92500	80000	70000	Ohms
Transconductance	1200	1350	1550	1800	Micromhos
Load Resistance	10700	9200	8000	6750	Ohms
Self-Bias Resistor	900	830	785	670	Ohms
Power Output*	0.33	0.75	1.5	3.4	Watts

* 9% total harmonic distortion.

Class B Power Amplifier—Triode Connection

(Grids No. 1 and No. 2 tied together, grid No. 3 tied to plate)

Plate Voltage	250 *max.*	Volts
Peak Plate Current	90 *max.*	Milliamperes
Average Grid Dissipation (Grids No. 1 and No. 2)	0.35 *max.*	Watt
Typical Operation *Values are for two tubes.*		
Plate Voltage	180	Volts
Grid Voltage	0	Volts

Zero-Signal Plate Current	6	Milliamperes
Effective Load Resistance (Plate-to-plate)	9400	Ohms
Power Output (Approximate)	3.5	Watts

INSTALLATION AND APPLICATION

The base pins of the 89 fit the standard six-contact socket which may be installed to hold the tube in any position. Sufficient ventilation should be provided to circulate air freely around the tube to prevent overheating.

For heater operation and cathode connection, refer to type 6A8.

For **Class A_1 Triode Operation** of the 89, the two grids (No. 2 and No. 3), immediately adjacent to the plate, are connected to the plate, while the third (No. 1) is employed for control purposes. Operation of the tube is then similar to any Class A Power-Amplifier Triode. When it is used as the driver for a Class B stage, the load requirements are changed as indicated in the note under CHARACTERISTICS. This change is recommended in order to minimize distortion due to the driver stage.

For **Class A_1 Pentode Operation** of the 89, the grid (No. 3) adjacent to the plate is tied to the cathode and thus serves as the suppressor, while the other two grids (No. 1 and No. 2) serve as the screen-grid and control-grid respectively. Operation of the tube is then similar to any Class A power-output pentode.

When the 89 is operated as a Class A Amplifier (triode or pentode), input transformer- or impedance-coupling devices are recommended. If, however, resistance coupling is used, a resistance of 1.0 megohm may be employed, provided the heater voltage does not rise more than 10 per cent above rated value under any condition of operation.

For **Class B Triode Operation** of the 89, the grid (No. 3) adjacent to the plate is tied to the plate, while the other two grids (No. 1 and No. 2) are connected together to serve as a single control grid. A discussion of Class B design features is given on page 20.

OPERATION CHARACTERISTICS
CLASS B OPERATION

92C-4201R1

